1.3 Pipe Patching and Plugging

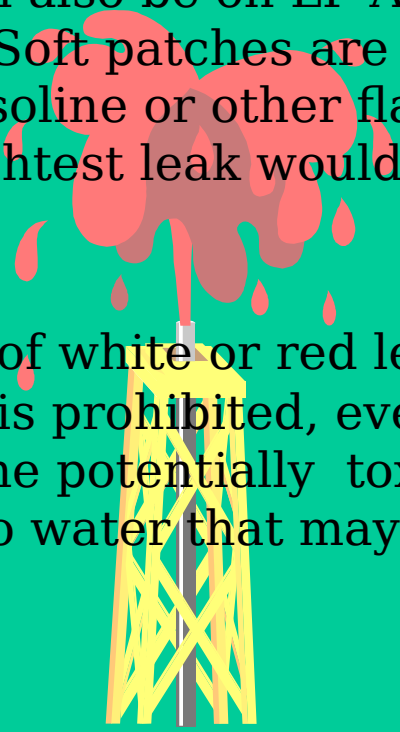
Lesson 1.3 Pipe Patching /Bulkhead Plugging and Patching

- Enabling Objectives:
  - **Identify** basic types and uses of soft and jubilee pipe patches IAW NSTM 079 VOL 2 and NWP-3-20.31.
  - **Identify** tools and materials use for fabrication of soft and jubilee pipe patches IAW NSTM 079 VOL 2 and NWP 3-20.31.
  - **Fabricate** and apply a banding patch to a rupture in a simulated environment IAW NSTM 079 and NWP 3-20.31.
  - **Identify** basic types and uses of bulkhead plugs and patches IAW NSTM 079 VOL 2 and NWP 3-20.31.
  - **Identify** tools and materials and used for fabrication of bulkhead plugs and patches IAW NSTM 079 VOL 2 and NWP 3-20.31.

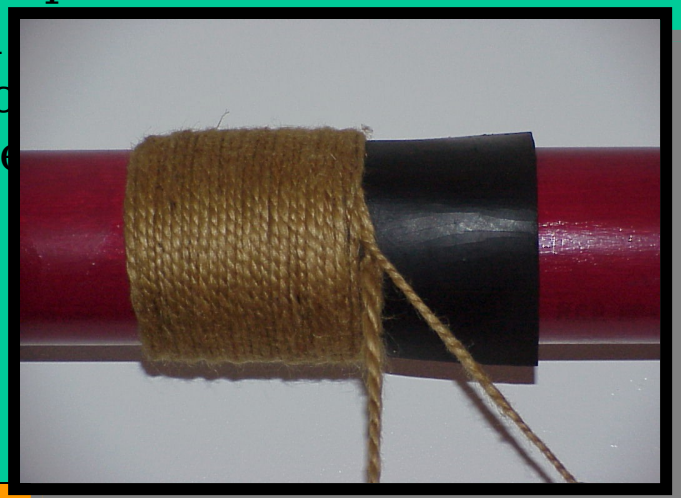
Pipe Patching

Soft Patch

A soft patch is normally used on fresh, and salt water systems. It can also be on LP Air and steam lines below 150 psi. Soft patches are not recommended for gasoline or other flammable fluid lines because the slightest leak would create a fire hazard.



Caution The use of white or red lead paint on any fresh water pipe is prohibited, even emergency , due to the potentially toxic the addition of lead to water that may be drinking.



Equipment

Soft Patch Kit

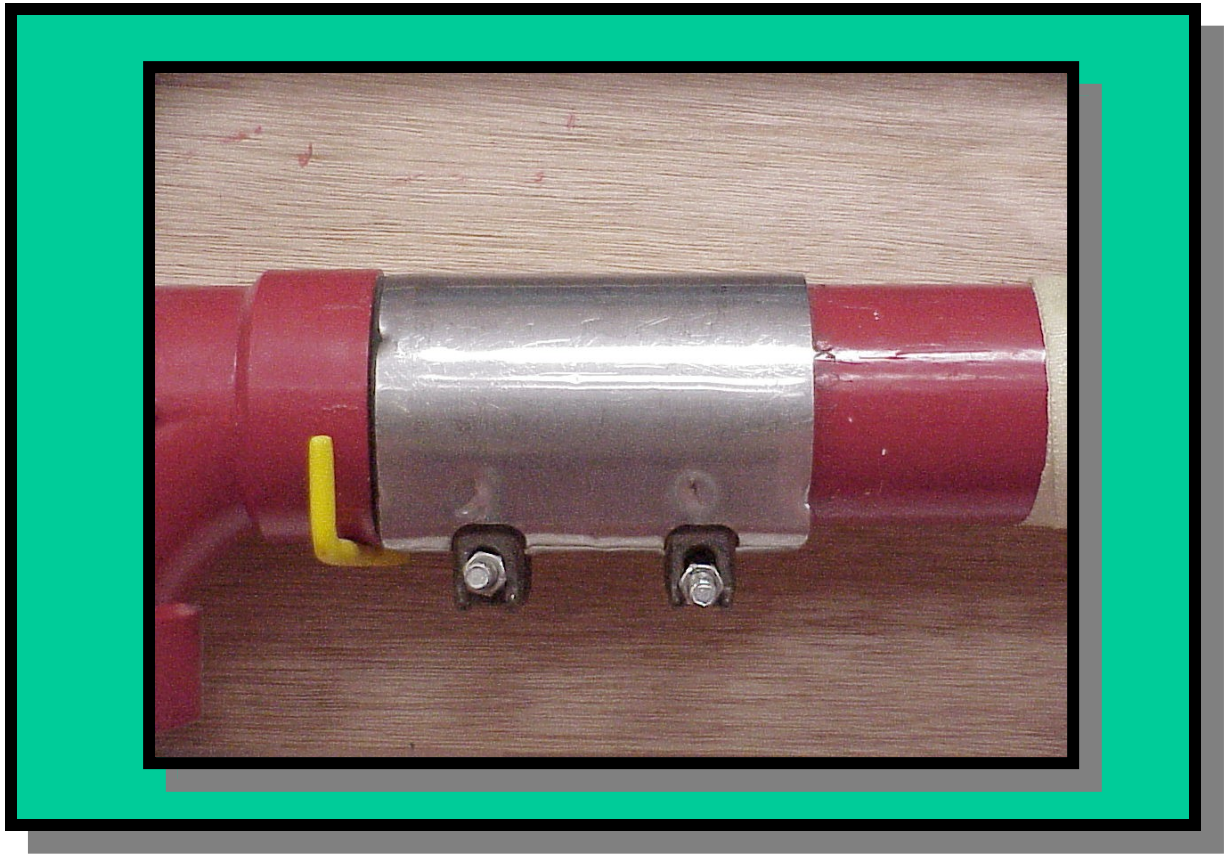
Writing Utensil

- **Procedure for applying a soft patch**
  - Secure water pressure
    - Drain as necessary

Sftpatch

- **Jubilee Patch** is used primarily used for fresh and salt water systems
  - Equipment
    - Jubilee patch
    - Adjustable wrench
- **Procedures for applying Jubilee Patch**
  - Reduce water pressure as necessary
  - remove rough edges on pipe
  - Put patch around up or down stream of rupture, nut side down and engage bolt into slot
  - **NOTE:** Ensure that the bolt is on the opposite side of the rupture
- Slide patch over rupture
- Center patch over rupture equalizing spray on both sides
- Tighten bolt with adjustable wrench until flow ceases
- Holds pressure upwards of 100 psi

Jubilee Patch



- **Band-it Patch** A comparatively simple patch to install. Used primarily on fresh and saltwater systems. Produces a very effective repair.

Metal backing plate
Gloves
Eye protection
Banding clip
Band it tool
100 Ft roll of strapping

Tension handle
Gripper assembly
Cutting assembly

Place a sheet of rubber rupture

Place a metal backing plate over rupture

- Measure out the working length of the strapping

- At the scene, cut an appropriate length of strapping material from the roll using the cutter assembly of the band-it tool.

NOTE: Cut the strapping on the roll side

Load the buckle onto the strapping, hold the buckle with the serrated portion (mouth) facing you and the bridge (ears) up, slide the strapping through the serrated opening of the Buckle until it extends past the bridge (ears) approximately 2 inches.

bend the strapping under the buckle

Bring the end of the band around the metal backin
and through the buckle twice

Pull the band while holding the buckle to remove as much slack as possible,

Bend the strap back toward the buckle (ears) to
band in place

Back the tension handle off until the gripper housi
assembly rest against the cutter housing

Place the band in the open slots of the band-it tool and gripper housing assemblies

With thumb on gripper handle , apply tension by rotating the tension handle clockwise.

If the gripper housing reaches the end of it’s travel before the band is tight, release the gripper lever, back off on the tension handle and place the gripper housing against the cutting housing, place the thumb on the gripper handle and continue to apply tension with the tension handle

When banding is tight stop turning the tension ha
at this point

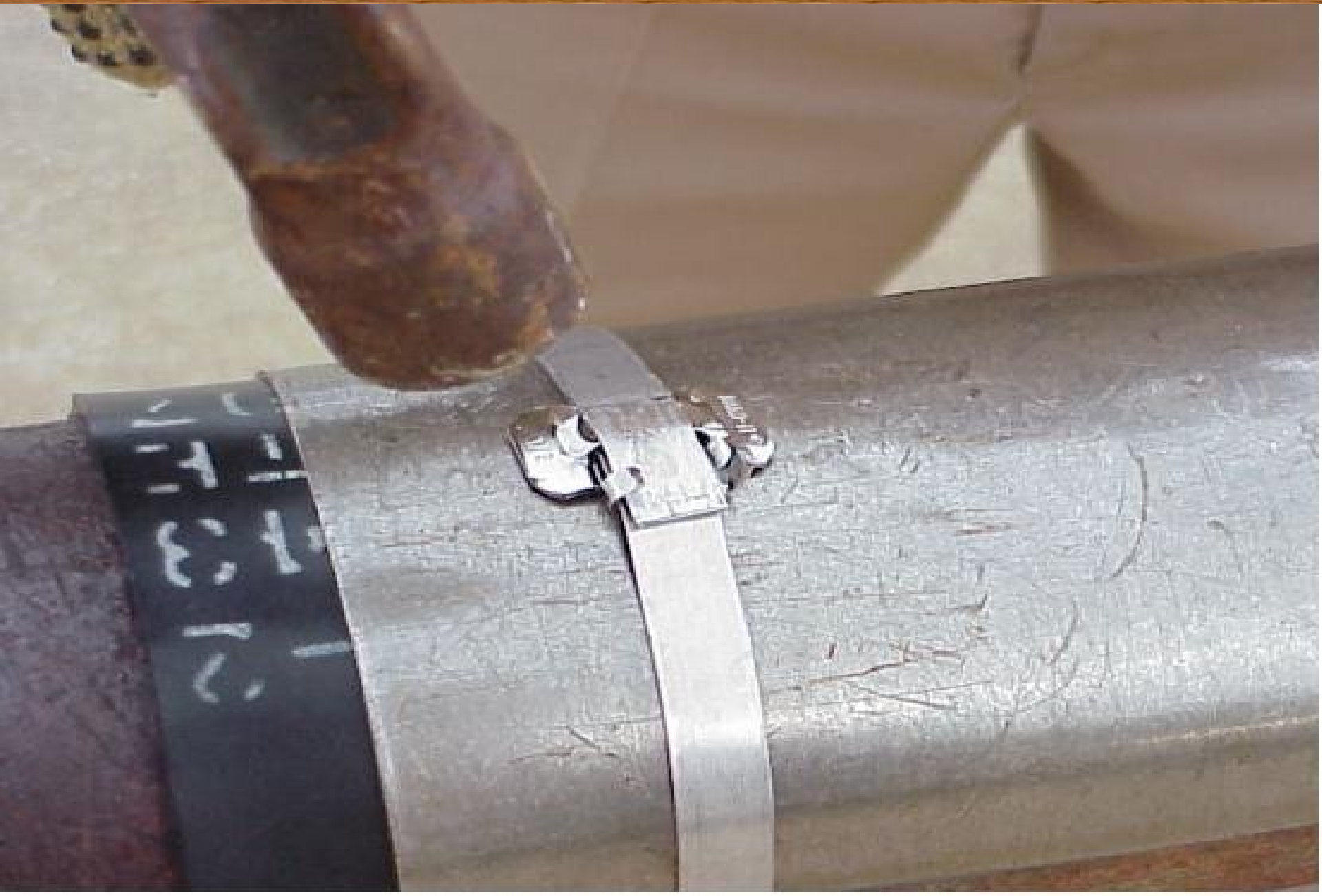
Roll the band-it tool over the buckle away from the operator, while backing off slowly with the tension handle throughout the entire operation.

CAUTION: FAILER TO BACK OFF THE EXTENSION HANLDE THROUGHOUT TH
ENTIRE OPERATION MAY
RESULT IN BREAKING THE STRAP

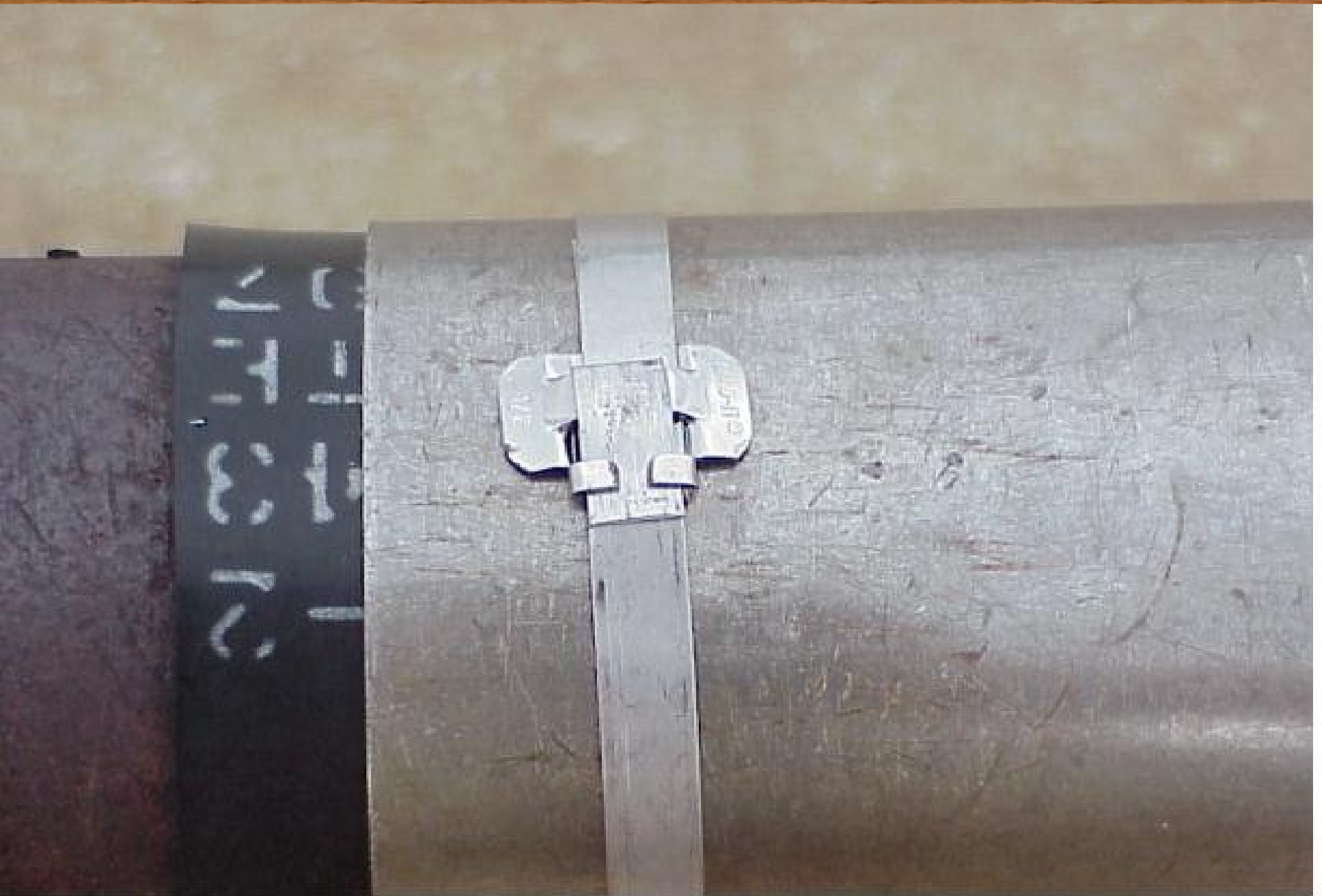
While resting the band-it tool against the buckle bridge (ears),

Pull the cutter handle to cut the strapping. The tool will automatically leave the material which can be bent down between the buckle bridge (ears) and secured.

Secure strapping by hammering down buckle (



Completed band-it clamp.



- **Emergency water activated repair patch (EWARP)** shall be used in repairing fresh water, salt water, compressed air, hydraulic fluid and lubricating oil piping systems, with pressure not to exceeding 300 degrees Fahrenheit.
- **Cautions:** Do not use on potable water inlet lines or fuel lines.

  - Equipment
    EWARP Kit
    Water

  - Procedures for applying EWARP
    Secure water pressure and drain as necessary

    Clean and roughen area to be repaired

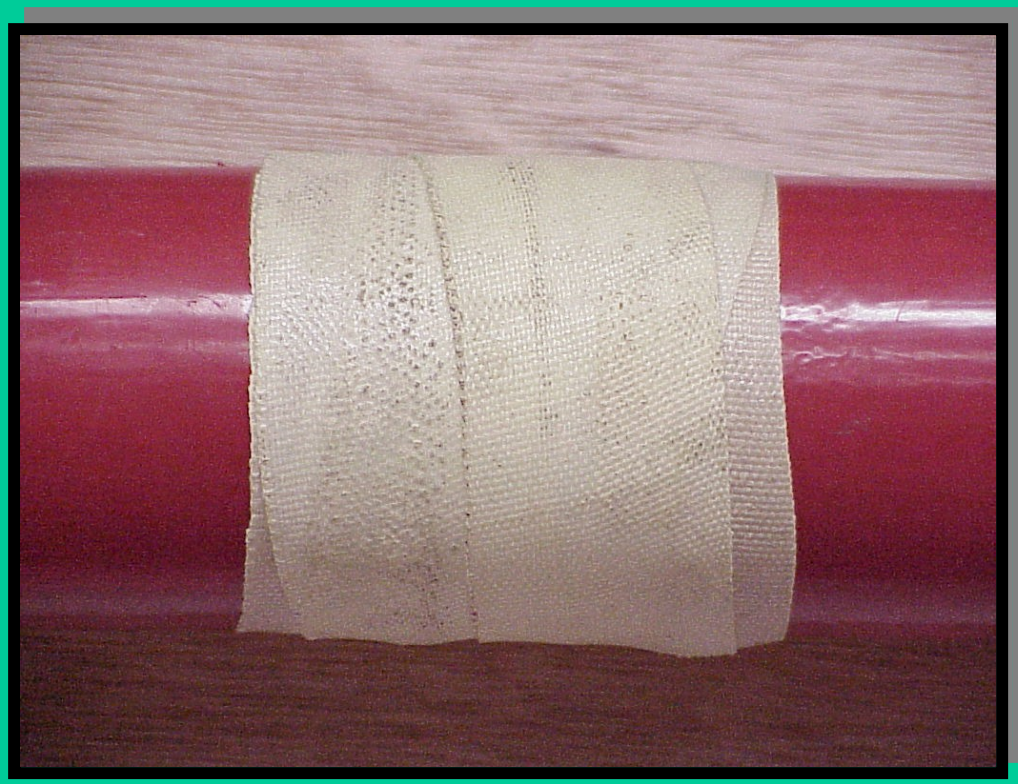
    Tear open foil pouch at notched area and remove EWARP

      WARNING: Before handling the EWARP, use protective gloves that are provided with the kit.

      NOTE: EWARP sizes: 2” x 5’ or 4” x 15’

Ewarp

EWARP

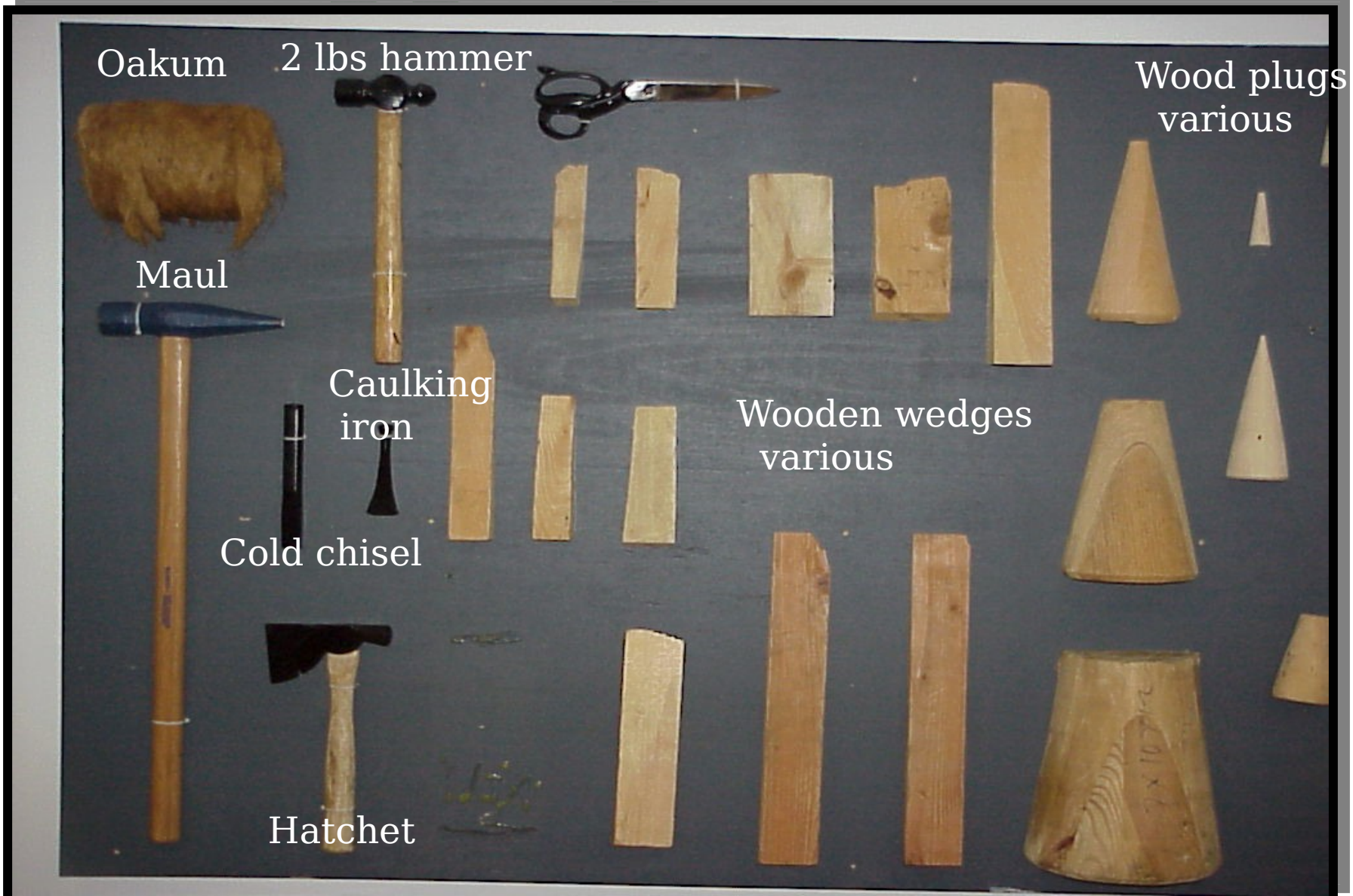


Bulkhead Plugging and Patching

- **Equipment:**
  - **NOTE:** Available from shipboard repair lockers as per Allowance Equipage List (AEL) 2-6880044272

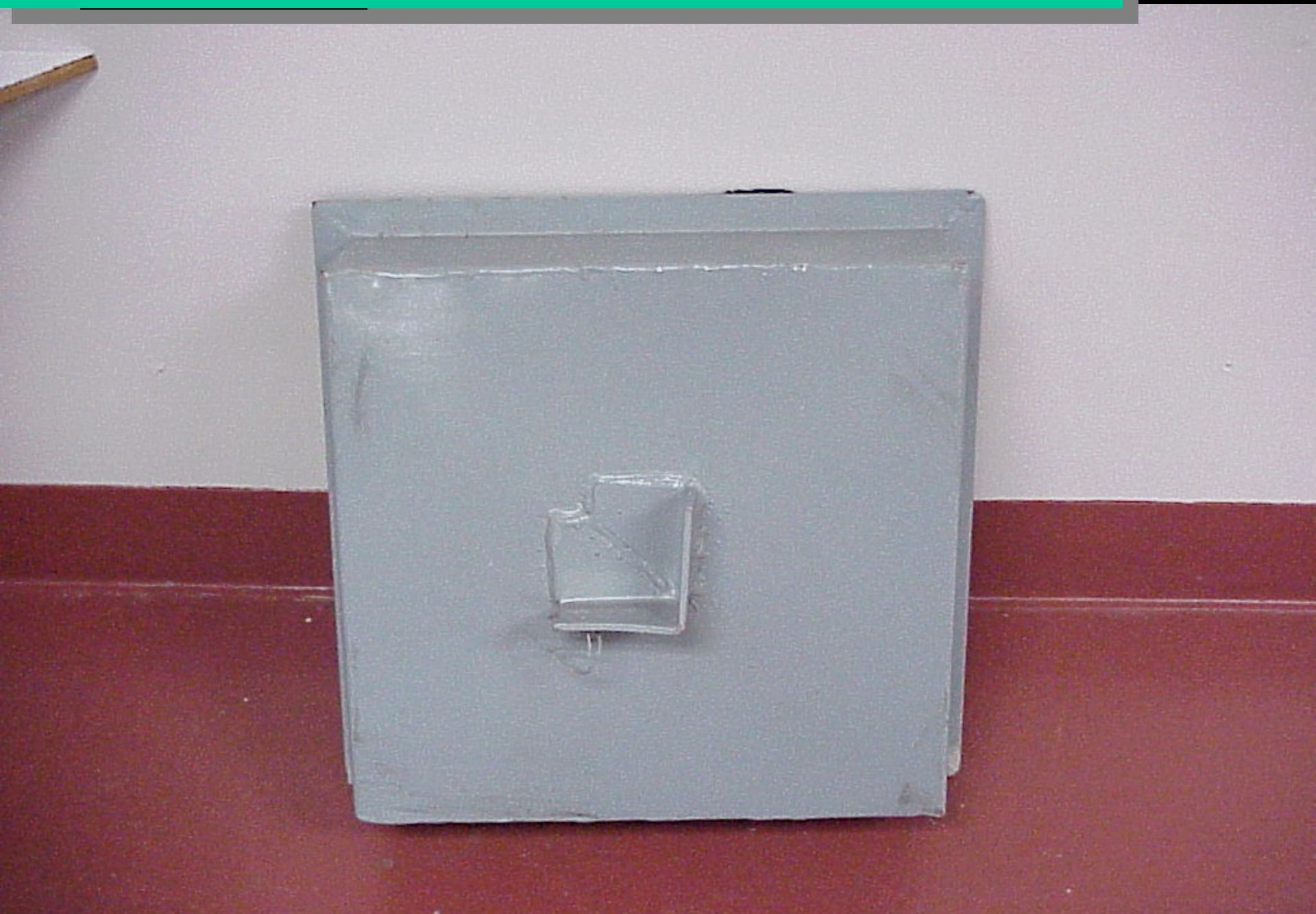
- **DC Plugging Kit**
  - Bag, kit
  - Cross-cut saw

Plugging kit



- **Types of plugs and patches**
  - Wooden plugs
    - Provide the simplest method for repairing
    - Conical, square-ended, or wedge shaped
      - **NOTE**: All of these plugs may be used in the combination to achieve greater conformation with the shape of the hole. Wrapping with light cloth or caulking with oakum can greatly reduce the ingress of water. Square plugs hold better in thin plating than conical plugs.
    - Made of soft wood
    - Unpainted
    - Commonly referred to as “DC Plugs”
    - Procedures for applying wooden plugs
      - Wrap plug with light cloth
      - Shove plug in hole
      - Drive plug firmly into hole with hammer or maul

- **Box Patch**



- **Box Patch**
  - Designed for holes with jagged edges protruding inward
    - Open ended box
    - Steel or wood
    - Up to 18 inches square by 6 inches deep
    - Gasket running along facing edges
      - **NOTE:** Gasket types and materials may vary
- **Procedures for applying box patches**
  - Place hook bolt or folding “T” through hole
  - Place gasket material and box patch over hole with bolt through patch
  - Tighten wing nut to seal hole
  - **NOTE**: Box patch may also be held in place by shoring.

- **Bucket patch**
  - An ordinary galvanized bucket can be used in a variety of different ways to stop leaks
  - Pushed into hole to form metal plug
    - Stuffed with rags and put over hole
    - Backed by gasket and held in place by shoring or hook bolt

- **Procedure for applying a bucket patch**
- Place hook bolt or folding “T” through hole
  - Place gasket material and bucket patch over hole with bolt through hole
  - tighten wing nut to seal hole

- **Other types of plugs and patches**
  - Hinged plate patch
  - pillow and mattress
  - Cloth plug
  - Life jackets
  - Flexible plate patches

- **Review and Summary**
  - Soft patch
    - Equipment
    - Procedure for applying a soft patch
  - Jubilee patch
    - Equipment
    - procedures for applying a jubilee patch
  - Banding patch
    - Equipment
    - Procedures for applying banding patch
  - Emergency water activated repair patch (EWARP)
    - Equipment
    - procedures for applying EWARP
  - Bulkhead plugging and patching
    - Equipment
    - Procedures for applying bulkhead plugs and patches